ASCE 7-16 Controversy

A Long Overdue Wake-up Call

By Jim DeStefano, P.E., AIA, F.SEI

I have been watching, with some interest as the recent drama unfolded, the effort to block the adoption of the American Society of Civil Engineers' ASCE 7-16 into the 2018 *International Building Code* (IBC). I was particularly amused to see the way that the structural engineering community has rallied in defense of a standard that they openly despise. If you get more than two structural engineers in a room, it is only a matter of time before they start complaining about the latest edition of ASCE 7 and the misery that it has brought to their practice.

Has ASCE 7 improved the practice of structural engineering or the lives of structural engineers? The answer is easy and not particularly controversial. There have been many editorials written about the misery that ASCE 7 has brought to the practice of structural engineering, yet I do not recall ever seeing an editorial extolling the virtues of the standard.

When I first started practicing forty years ago, the building code section on structural loading was somewhat brief and only filled a few pages. Although the loading provisions were easy to understand and interpret, they were not sufficient. The American National Standards Institute (ANSI) Standard 58.1, first released in 1972, was a huge improvement. It contained all of the important stuff that had been missing from previous building codes, such as snow drift loads and a rational approach to wind pressures, yet it was still easy to understand and use. When ASCE 7-88 replaced ANSI 58.1-82, the loading provisions became more complex and less intuitive. It has been downhill ever since. Today, structural engineers must spend a disproportionate amount of their time determining the loading criteria for their projects rather than designing the structures.

Has ASCE 7 improved the safety of structures? The justification for more complex loading provisions has always been that better, more accurate loading data results in safer structures, but is that really true? There is not much evidence to support that argument. Building structures that were designed before 1988 do not seem to be collapsing. Those buildings that do fail during extreme events, such as hurricanes, blizzards, and earthquakes, are mostly non-engineered and pre-engineered structures with flawed designs.

Several years ago, the Structural Engineering Institute/ Business and Professional Activities Division (SEI-BPAD) committee embarked on a trial design program. A group of experienced structural engineers was asked to solve a handful of routine design problems requiring the application of ASCE 7. The results were distressing. The answers were so scattered that they did not fit into a bell curve and the committee members could not even agree on what the correct answers were. The conclusion was obvious. Overly complex loading provisions have increased the risk that an engineer will misinterpret the loading provisions and under design a structure.

Do we need a cookbook for structural engineering? There seems to be a belief, held by many engineers that serve on standards committees, that building code adopted standards should be written as cookbooks that prescribe each step that an engineer takes in designing a structure. This kind of thinking has had a deleterious effect on the profession and tends to stifle innovation and the application of sound engineering principles. We should not need a cookbook to tell us how to design a structure.

What we really need is stability in our building codes! It is reasonable to expect codes and standards to be improved, refined, and to be made more understandable with each new edition. Revisions must be made to make confusing provisions easier to understand and apply.

However, when each new edition of ASCE 7 unveils an entirely different way of calculating wind loads, or maybe six different ways to calculate wind loads, it only results in chaos and instability. Can everything that we have been doing up until now really be that wrong? Do we really need to relearn how to calculate loads every six years?

Should the structural engineering community be a rubber stamp for new standards? Every time a new edition of ASCE 7 is released, everybody complains and gripes. Then they suck it up and buckle down to try and learn the new provisions. Like good sheep, we all go along.

Recently, other construction industry groups like the National Association of Home Builders (NAHB) and the National Roofing Contractors Association (NRCA) have taken a close look at some of the provisions in ASCE 7-16 and found the standard to be unreasonable and out of touch. Could it be that they are right? The structural engineering community reacted defensively. We may feel that it is our profession that is being attacked – how dare these guys suggest that a standard produced by ASCE not be adopted into the IBC.

Where do we go from here? Maybe it is time to take back our profession – make structural engineering great again. Despite all the grumbling, the ASCE 7 committee has not gotten the message. We need a reasonable and practical standard for calculating loading criteria that does not keep changing.

I do not mean to belittle or demean the hard work that has gone into writing the ASCE 7 standard. I have served on SEI standards committees, and I know the effort that goes into them. However, the standards committee needs to be sensitive to all of the unnecessary hard work and lost profits they have generated for all of us that are trying to make a living designing structures.

We cannot turn back the clock to 1982 and go back to the ANSI 58.1 standard, but it would not be so bad if we did.

Maybe those guys at NAHB and NRCA have the right idea and are not really anarchists. If we want to take back our profession, a grassroots movement is needed. Not just at the ICC hearings, but at every state level. If we, as structural engineers, start lobbying to delete ASCE 7 from our local state building codes in favor of simple, understandable loading provisions, maybe then our message will be heard.▪

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